2.0 SITE LOCATION AND FEATURES

Bradford Island is part of the Bonneville Lock and Dam Project. At the island's location, the Columbia River forms the border between Oregon and Washington (Figure 1). The landfill site is in the northeast corner of Bradford Island upstream of Bonneville Dam and is located within the State of Oregon. The site is within the southwest quadrant of Section 22, Township 2 North, Range 7 East, Willamette Meridian. The site is not currently part of the routine operation of the Bonneville Lock and Dam, and is managed long term as a wildlife habitat for geese under the Bonneville Master Plan. No change from that land use is expected in the foreseeable future. Figure 2 shows the location of the landfill and the portion of the river investigated during the recent work.

The elevation of the ground surface at the landfill is approximately 110 feet above mean sea level (msl). The normal elevation of the Bonneville pool is 72 feet msl.

The ground surface of the landfill site is relatively flat, sloping gently toward the west where the site access road enters the area. To the south, the ground surface rises moderately to a wooded upland area. To the north and east, the island drops steeply to the Columbia River. Surface runoff from the surrounding area tends to run onto the landfill site.

2.1 GEOLOGY AND HYDROGEOLOGY

Subsurface soils at the landfill site consist of unconsolidated silty-sand alluvium underlain by intermixed alluvium and bedrock. Unconsolidated deposits are underlain by sandstone, siltstone, and conglomerate, which is referred to as the "slide block". Soils encountered during previous investigations consisted of brown, well-graded, dense landslide deposits with varying percentages of sand, gravel, and silt. Groundwater has been encountered on the landfill at depths ranging from approximately 11 feet below the ground surface (bgs) to 18 feet bgs.

URS conducted a seep survey along the shoreline on March 4, 2000, intended to identify locations where groundwater discharges to the land surface. The survey included the north, east, and southeast sides of Bradford Island. One small groundwater seep was identified on the north side of the island, approximately 20 feet west of monitoring well MW-5 and approximately 4 feet above the level of the river. On April 13, 2000, the seep discharge rate was measured at approximately 4 gallons per hour, and samples were collected of both the groundwater discharging from the seep, and from the soils immediately beneath the seep location. The soil beneath the seep was orange-brown. Two additional small seeps were observed in the same area on May 2, 2000.

Except for the small seeps described above, groundwater is assumed to discharge to the Columbia River, below the pool level.

2.2 BACKGROUND

The landfill was used as a waste disposal site from the early 1940s until the early 1980s. Waste was reportedly disposed of in several individual pits excavated for this purpose within the landfill area, rather than in a single landfill cell. The upland areas of the landfill, including the storm drain system, are the focus of ongoing site investigative activities.

2.2.1 Landfill Investigations

Previous investigations focused primarily on the landfill itself, and consisted of the site investigation and the supplemental site investigation. On the north edge of the island, waste materials exposed at the surface include concrete rubble, steel cables, a few empty buckets and drums, and miscellaneous trash. On the surface of the landfill, various waste items were observed, including plastic planter buckets, empty cans and paint solids, metallic slag, and partially burned construction debris. Subsurface exploration identified a wide variety of waste including broken glass, ceramic electrical insulators, rubber hose, wood, tires, metal debris, roofing paper, mercury vapor lamps, and pipe.

Analytical results for surface and subsurface soil samples collected from the site showed relatively low concentrations of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, herbicides, pesticides, and PCBs (URS, 2000). Analytical results from the perched water beneath Bradford Island Landfill identified relatively low levels of VOCs, SVOCs, petroleum hydrocarbons, and metals (URS, 1999).

Two PCB-containing light ballasts were discovered at the landfill site in March 2000. The ballasts are components typical of the electric street lighting system at the Bonneville Lock and Dam. The ballasts are cylindrical steel devices, approximately 18 inches tall and 10 inches in diameter. The first ballast was observed on the north shore of Bradford Island in about 1-foot of water, during the URS reconnaissance for groundwater seeps. The second ballast was discovered by USACE personnel on the north slope of the island. The USACE opened the sealed light ballasts and collected and analyzed samples of a tar-like substance. The tests showed that the ballasts contained PCBs at concentrations of up to approximately 600 milligrams per kilogram (mg/kg).

In March 2001, two additional ballasts, similar to those described above, were discovered along the river shoreline near the groundwater seep. These units have not been tested for PCBs.

Because of the evidence that Bradford Island was formerly used to dispose of light ballasts, the USACE reviewed internal records and estimated that up to 50 ballast units could have been disposed of at the landfill.

2.2.2 In-Water Waste Recovery

The discovery of the light ballasts on the shore of the island led to an underwater survey during October and November 2000. The survey identified several additional electrical items in the

river next to Bradford Island, including light ballasts, electrical insulators, lightning arresters, electrical switches, rocker switches, a breaker box, and electrical capacitors. Most of the waste-related items were observed in piles located on the east and north edges of the island (Figure 3). Divers recovered some of the electrical items. Characterization and off-site disposal of the recovered items has occurred. Other observed non-electrical wastes were a metal pipe, wire rope, concrete, an automobile bumper, and a stove.

In December 2000, approximately 60 electrical items were recovered from the easternmost pile (hereinafter described as "Pile #1"), including post insulators, lightening arrestors, electrical panels, and one interteen capacitor[1]. Sediment samples were collected from areas close to where the electrical items were found. Analytical chemistry tests identified PCBs in the sediment samples at concentrations ranging from 0.15 mg/kg to 8.3 mg/kg. Appendix E contains the technical memorandum that discusses the December 2000 waste recovery activities.

2.2.3 Storm Drain System

While the USACE was dissembling PCB-containing transformers in the parking area on the east side of the Bradford Island Sandblast Building on November 22, 1995, approximately 1 quart of PCB-containing oil was released. The oil was spread by stormwater runoff. The release was contained using booms and sorbant pads, and soil samples were collected. At the time of the release, samples were not collected from the storm drain system that may have captured the spill or any runoff from the area. Runoff from the area is captured by the storm drain and conveyed to the Columbia River by underground pipes.

Other site features near the PCB spill that could impact the storm drain include sandblast grit from the sandblast shop and blowdown water generated from a nearby compressor. Figure 4 depicts the approximate location of the storm drain system and identifies surrounding site features.

The USACE is in the process of investigating the storm drain system to determine whether residual contamination remains in the area drained by this system.

[1] During this survey, the electrical equipment was grouped into 3 separate piles – one to the east and two to the north of the Bradford Island.